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Physiologic Observations After Thoracic, Lumbar and Sacral Cordectomy: On August 31, 1948, a thoracic, lumbar and sacral spinal cordectomy was completed on a 27 year old man. This procedure was done in an endeavor to remove a malignant astrocytoma (glioblastoma multiforme) of the spinal cord which had been identified on February 16, 1948. It was hoped that the tumor could be eradicated by removal of the involved spinal cord. Inasmuch as the paralysis had relentlessly crept cephalad, death from destruction of the spinal cord by this glioma seemed imminent. Preliminary investigation showed that the spinal cord below the cervical segments could be removed with relative safety. To improve the patient's situation, flaccidity of the lower extremities, trunk and bladder was necessary. This would be accomplished by such cordectomy.

The operation resulted in the removal of the entire spinal cord except the cervical and first thoracic segments. The patient was able to sit in a wheel chair on September 16, 1948. Certain observations were made which are recorded at this time.

The sensory loss was complete to all modalities from the first thoracic segment inferiorly. Below this dermatome, there was complete flaccid paralysis of all the somatic musculature. There was rapid atrophy of all voluntary muscles associated with demineralization of the corresponding bones of the lower extremities, pelvic girdle and spinal column.

The effect on the involuntary nervous system was profound. Because the first thoracic dermatome was intact, the patient did not have Horner's syndrome and was able to perspire on the face and barely perceptibly on the neck when exposed to heat.

The anhidrosis which occurred is similar to that which would take place from a sympathectomy with a removal of the paravertebral ganglia for the same area. In a normal man, generalized sweating may be induced by exposure of the body to a high external temperature. This thermoregulatory sweating occurs as a reflex mediated through the central nervous system and the sympathetic nervous supply to the sweat glands. Thus, whenever the vasomotor pathways to a given cutaneous area are interrupted, sweating in those areas induced reflexly by heat ceases permanently. In contrast, when such anhidrosis is present after the interruption of the sympathetic pathways, sweating may be induced by the administration of such parasympathetic drugs as pilocarpine and furmethide. This takes place chiefly by the effect of these drugs on the endings of the cholinergic fibers as well as some direct effect on the sweat glands. Likewise, in this patient after the cordectomy, sweating over the entire body, but more excessively on the face and neck, occurred after the administration of furmethide.

It was interesting that gustatory sweating developed on the left side of the face of the patient. In certain normal individuals, spicy food may produce sweat on the face. According to List and Peet, this represents a cranial parasympathetic reflex (cholinergic) in such individuals. The development of the gustatory

sweating in this patient could not be adequately explained because of the diffuse involvement of the nervous system by the tumor, as noted at postmortem examination.

Blood pressure observations on the patient were quite significant. When the spinal cord was transected at the second thoracic dermatome before removal of the cord, there was no change in blood pressure. It was 110 mm. of mercury systolic and 80 mm. diastolic. The patient's spasticity persisted and it was felt that this was a factor in the maintenance of normal blood pressure. After radical resection of the cord had been accomplished, the blood pressure persisted at lower levels. While the patient was supine, it averaged 100 systolic and 60 diastolic. With the patient in a wheel chair, the systolic pressure averaged 76 to 85 and the diastolic 50 to 38. This result is considered to have been possible because of the position he assumed in the chair, which prevented pooling of blood in the lower extremities. When he was placed on the tilt table in a recumbent position and subsequently elevated 10^{o} per minute, the blood pressure became imperceptible after 4 minutes at 40^{o} and he fainted.

Further pharmacologic studies indicated that when 0.25 cc. of 1:1,000 solution of epinephrine was given subcutaneously, there was a definite rise in the blood pressure. This was not unexpected because epinephrine acts directly on the effector cells. When mecholyl was given to the patient, the usual fall in blood pressure occurred with dilation of the peripheral vessels and increase in the pulse rate. Thus, because of the peripheral action of these, a normal response to both of them occurred in this patient.

The patient's bowel habits were essentially unchanged from their previous paraplegic state following removal of the spinal cord below the first thoracic dermatome. Enemas were required every second or third day to maintain adequate fecal evacuation. Clinically there was no evidence of sensation in the intestinal tract below the gastro-duodenal level. The patient, however, occasionally complained of epigastric discomfort which was observed to occur with emesis. This discomfort was not what he considered to be pain. A chronic duodenal ulcer observed subsequently was assumed to be a factor in these episodes of discomfort. The role of the vagus nerve in the transmission of this discomfort is speculative. Unfortunately, further gastrointestinal studies were not obtained because of the patient's untimely death on April 7, 1949.

The patient's rehabilitation never reached the point where urethral catheter drainage, which was instituted subsequent to the removal of the spinal cord could be dispensed with.

At the time of first admission to the Clinic when he was in spastic paraplegia (some 2 years after the onset of symptoms) an automatic bladder of excellent efficiency had developed. Urine was retained for several hours or until 400 to 450 cc. had accumulated. At this distention a sensation of fulness would

develop and then the bladder would discharge the entire amount rapidly. Catheterization for residual urine showed none. The urine was grossly clear, and microscopic study revealed only a few pus cells in each high-power field. An excretory urogram made June 25, 1948, revealed normal kidneys and ureters, and the vesical outline was interpreted as normal, although the bladder was large.

Subsequent to the removal of the thoracic segment of the cord the efficiency of the bladder was reduced and approximately 200 cc. of urine was found on catheterization; hence an inlying urethral catheter was put in place. This was changed regularly and the urine remained grossly clear, although Pseudomonas was found on culture. Completion of the other stages of the cordectomy produced a flaccid paralysis below the level of the first thoracic segment and, as expected, also created a flaccid type of bladder. On a number of occasions several weeks postoperatively the catheter was removed but spontaneous emptying of the bladder did not occur as it had prior to cordectomy, even though large amounts of urine accumulated. Furthermore, in spite of prolonged tidal drainage, automaticity could not be restored; hence, it became necessary to use a Foley catheter continuously.

In patients with traumatic paraplegia, if the level of injury is above the conus medullaris, the intact bladder reflex center permits the development of an automatic bladder which is often quite efficient. On the other hand, if the conus is destroyed, an autonomous or overflow type of bladder which retains large amounts of residual urine is usually produced. In such cases transurethral resection of the vesical neck which lessens sphincteric resistance will restore a voluntary type of urination, provided the patient still has the ability to contract the abdominal muscles powerfully. This patient, however, had no abdominal muscle power after cordectomy. Nevertheless, it was hoped that when his condition permitted, the vesical neck could be resected in order to decrease sphincteric and urethral resistance sufficiently to allow him to empty his bladder by exerting pressure with his hands over the suprapubic region. In many other patients with a so-called denervated bladder due to trauma, this type of voiding has been established by one or more transurethral resections of the vesical neck. However, in those cases the diaphragm was undoubtedly useful in increasing intra-abdominal tension. It was realized that complete removal of the cord in this case might complicate the problem considerably.

Cystometric study made March 26, 1949, indicated the presence of some tone of the bladder wall as evidenced by the development of a pressure of 52 cm. of water when a distention of 350 cc. was reached. At this point water leaked alongside the catheter. No rhythmic contractions were apparent.

Cystoscopic examination was postponed in the hope that the patient's condition would improve sufficiently to permit resection of the vesical neck at the same time. Unfortunately, his death prevented completion of the study. At necropsy the wall of the bladder was found to be somewhat hypertrophied and

slightly inflamed. It was slightly trabeculated but no cellules or diverticula were present.

In a previous article, the authors described the syndrome of gynecomastia, hypoproteinemia, decreased metabolic rate and pathologic evidences of demasculinization which developed.

In reviewing these physiologic observations it is pointed out that a man may live and be ambulatory in a wheel chair without that part of the spinal cord that is below the cervical segments. This case has presented certain physiologic phenomena of interest. It also offers considerable speculation concerning possible eradication of less extensive gliomas with possibly more favorable results than have heretofore been realized. (Proc. Staff Meet., Mayo Clin., March 28, '51, C. S. MacCarty, et al.)

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Terramycin in the Treatment of Yaws: In April 1950, the investigation of terramycin therapy in yaws was initiated at the Experimental Yaws Center of the Service Cooperatif Inter-American de la Sante Publique, Gressier, Haiti. One hundred and fifty patients, all of whom were West Indians, were selected for this study with the object of obtaining representative examples of each of the stages of yaws. Their ages ranged from 5 through 70 years; 62 were female and 88 were male. All of the patients were ambulatory and were observed throughout the course of therapy and for suitable periods thereafter.

The types of lesions were as follows: 1 had a primary lesion only; 36 had both primary and secondary lesions; 1 had a primary lesion, secondary lesions and plantar lesions; 26 had secondary lesions only; 7 had secondary lesions with plantar lesions; 17 had dry plantar and palmar lesions only; 11 had wet plantar lesions only; 6 had both wet and dry plantar lesions and 45 had tertiary lesions. The primary lesion "mother yaw" or "maman pian" in 28 cases was deeply ulcerated and showed marked bacterial infection. The secondary lesions included isolated and generalized multiple frambesiomas, papular, lichenoid and circinate (ringworm yaws) eruptions, condylomas, mucocutaneous lesions, palmar and plantar lesions, both wet and dry. With the exception of the papular, lichenoid and circinate eruptions, the secondary lesions were usually infected with large numbers of bacteria. The dry plantar and palmar lesions were manifest as swollen, painful hyperkeratoses with extensive fissures and by large verrucous protrusions surrounded by deep circular fissures. The wet plantar lesions were apparent as superficial and deep ulcerations and ulcerated large nodules on various parts of the soles and heels. At times the dry lesions extended over the entire plantar surfaces of one or both feet and in some cases the wet lesions were also very large and involved at least a third of the sole. The latter were usually heavily infected with bacteria and appeared as areas of

granulation tissue covered with purulent material. Both wet and dry plantar lesions were very painful and sensitive to pressure and interfered with walking, producing in effect "crab yaws." The tertiary lesions included periostitis, bone gummas, dactylitis, arthritis, periarthritis, periarticular loss of cutaneous elastic tissues and scarring, large granulomatous lesions with infected draining sinuses, fascial contractions about the joints producing ankyloses and a variety of deformities, chronic deep fungating ulcers and gangosa.

The patients appeared sick, had fever and complained usually of headache, malaise, joint pains and stiffness, lassitude, abdominal soreness and insomnia. Many had enlargement of the lymph glands, especially the inguinal, femoral and submental nodes. All of the cases were seropositive.

A somewhat arbitrary dose of 7 Gm. terramycin hydrochloride was decided upon for treating the initial group of cases. This dose was given over a 3 day period in single doses of 3 Gm. on the first day and 2 Gm. on the second and third days. With this regimen of therapy, rapid clearing of the primary and secondary lesions occurred and rapid elimination of the treponemata from these lesions was obtained. However, after observing the first 65 cases for a period of 2 months, it was noted that 2 of the patients again presented themselves with infectious cutaneous lesions which were considered instances of relapse. Although the frequency of relapse was no greater than that following massive doses of penicillin, it was decided to increase the dose to 10 Gm. and to prolong therapy to 5 days. The next 85 patients were treated with 5 daily doses of terramycin hydrochloride of 2 Gm. each. In those instances in which there were large ulcerated and secondarily infected primary lesions, or deep and extensive tertiary ulcers, terramycin hydrochloride was sprinkled directly on the lesions daily until healing was effected or closure had been obtained.

It is too soon to evaluate these cases of yaws treated with terramycin except to state that clinical arrest of the disease has been obtained in each. Too little time has elapsed to evaluate them from the standpoint of serological reversals, a fact also true in cases treated with procaine penicillin.

With the exception of the 2 relapsed cases in the first group of 65 patients who received a total of 7 Gm. of terramycin within a 3 day period, there have been no other instances of relapse or reactivation of infectious lesions. Both patients responded just as well to the second course of therapy as they did to the first. This incidence of relapse of infectious yaws is considerably less than that observed in cases of yaws treated with 300,000 units of procaine penicillin in which relapses occurred in more than half. The incidence of relapse with the smaller dosage of terramycin was no greater than in those cases treated with massive doses of penicillin.

Four patients, having gone home to areas where yaws is highly endemic, returned to the Center 6 to 10 weeks after completing terramycin therapy with

new primary lesions and secondary lesions. The primary lesions in 2 were engrafted on residual small ulcerations which were present at the time of their discharge from the Center, while in the other 2 new primary lesions occurred at the site of a recent traumatic skin abrasion.

The remarkable effects of terramycin on both wet and dry plantar lesions (crab yaws) have not been matched by any of the antibiotics studied or observed by the authors, although aureomycin approaches this antibiotic in effectiveness for the treatment of these as well as primary and other secondary lesions. The effects of terramycin in tertiary yaws is no less startling. The supplementation of systemic therapy with topical therapy has accomplished the rehabilitation of a number of patients who might previously been considered hopeless cripples. The apparent growth stimulating effect of terramycin has not been observed with either penicillin or aureomycin.

The disfiguring and crippling lesions of the late stages of yaws are serious economic problems, and unfortunately are disregarded in reports or discussions of its therapy. The arrest or, in many instances, improvement of these lesions can be obtained with terramycin administered systemically and topically. (Antibiotics & Chemotherapy, April '51, E. H. Loughlin & A. A. Joseph)

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Streptokinase and Streptodornase in the Treatment of Diabetic Gangrene: Gangrene is one of the commonest and most serious complications of diabetes mellitus. Because of the underlying vascular changes, advances in the conservative therapy of this condition have not been striking. It has been recognized that if the gangrenous area is superficial and demarcated with adequate circulation to the involved part, nonoperative therapy is justified. Failure to obtain satisfactory response, however, is a definite indication for surgical intervention as soon as possible. Close cooperation between internist and surgeon is essential.

Frequently operation is impossible; surgical treatment may be refused by the patient. Often a life of semi-invalidism is preferred to amputation. Again, surgical measures may be contraindicated by the patient's physical condition; for even with recent medical and surgical advances postoperative complications constitute one of the most frequent causes of death in diabetes.

Because of the unsatisfactory status of the conservative therapy of diabetic gangrene, effectiveness of two enzyme preparations obtained from hemolytic streptococci, i.e., streptokinase and streptodornase, was investigated. In three instances the results were excellent. There were rapid relief of pain and epithelization of the involved area. In one case in the series the prognosis with conservative therapy was obviously hopeless, but amputation was refused by the patient. The results obtained with the use of streptokinase, streptodornase and

aureomycin were astonishingly good. In another instance it was initially believed by all that conservative therapy was futile, inasmuch as two ulcerations had been present (with only brief periods of improvement) for 32 years. Nevertheless, in 6 months progress was sufficient to warrant members of the surgical service recommending plastic repair. In another case in which extensive and painful radiation necrosis occurred in a senile diabetic, epithelialization and relief of pain shortly followed the institution of local therapy with streptokinase, streptodornase and aureomycin.

In all but one case, streptokinase and streptodornase were combined with aureomycin powder to give a liquid, which shortly after local application formed a semipaste. This removed the necessity for a surgical dressing, was comfortable and controlled or prevented secondary infection. Wet soaks were required every second or third day to permit adequate penetration of the lesion by the medicament.

In no instance were toxic reactions to streptokinase and streptodornase noted. The local application of these enzyme preparations, with or without aureomycin, is quite simple. Therefore, treatment may be carried out at home by the patient or members of his family.

The evaluation of any conservative therapy in diabetic gangrene is difficult. The improvement in these patients was undoubtedly aided by the regulation of diet and insulin dosage, administration of supplementary vitamins, control of physical activity and treatment of secondary infections. However, there can be little doubt that the clinical results were essentially due to "medical debridement" using streptokinase and streptodornase. Especially was this obvious in the patient with radiation necrosis. It appears that streptokinase and streptodornase are of great value in the conservative treatment of diabetic gangrene. (A. M. A. Arch. Int. Med., April '51, L. V. McVay, Jr. & D. H. Sprunt)

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Diabetic Coma: Diabetic coma is one of the greatest of medical emergencies. Although improved therapy for diabetes has greatly reduced the incidence and danger from this complication, it is still encountered to such an extent that nearly every large hospital receives some of these patients every month.

The main objectives in coping with "the diabetic coma problem" deal with its prevention, and the correction of ketosis when it becomes established. The prevention of diabetic coma involves (1) appropriate control of the diabetes, (2) training of the patient, and (3) emergency measures during acute complications.

To reduce the mortality from diabetic coma, emphasis is placed on early diagnosis and early treatment. The diagnosis should be made at the bedside and the preliminary treatment begun before moving the patient to a hospital

without needless delay. To shorten the duration of coma is to increase the likelihood of recovery. With each hour in coma in excess of 6 hours the chances of recovery are reduced at a rapid rate and if coma has persisted for more than 18 hours the chances of recovery are small.

The circumstances leading to diabetic coma include, in sequence, uncontrolled diabetes, a reduction in the amount of carbohydrate metabolized, an increase in the breakdown of fat, dehydration, disturbance of electrolyte pattern of the blood, peripheral collapse and renal failure.

Correction of hyperglycemia and glycosuria and the maintenance of a normal state is the most certain method of preventing coma. This applies when there are no complications, but it applies especially during the course of acute complications and notably acute infections. It is unusual for a patient to develop diabetic coma unless some acute precipitating complication is present. Barring such complications, ketosis tends to progress slowly over days and weeks, but in the presence of an acute pyogenic infection, unchecked, it progresses rapidly. Progression from a mild ketosis to diabetic coma may occur in from 6 to 12 hours.

Control of the diabetes is accomplished and maintained by (1) dietary measures and with insulin therapy when the severity of the disorder warrants this measure; (2) training of the patient; and (3) by making appropriate changes in diet and giving insulin during the acute complications.

The diabetic should have a broad general knowledge of his disease, and it is imperative that he be taught concerning: 1. The preparation, measuring, or in the unusual case, weighing and the distribution of his diet. 2. The brand of insulin he is using, the dose, the time of injection, and how and where to give the insulin. 3. The unfavorable effect which acute complications have on diabetes and the need for insulin. 4. The danger of omitting insulin because of anorexia which so frequently is a symptom of early ketosis. Such anorexia is often precipitated by an acute infection. A dose of insulin should never be omitted because of anorexia if strongly positive reactions for glycosuria prevail. 5. The testing of the urine for sugar, and which specimens to test during the day. It is especially important that every diabetic patient make arrangements to have these tests made during episodes of illness. It is striking how frequently patients who are most conscientious about testing for glycosuria while well, will stop making the tests when they become ill. 6. The necessity of having his physician quickly take over the management of the diabetes in the event of anorexia, acute febrile attacks, and uncontrolled glycosuria of severe degrees. 7. The factors which precipitate coma, the speed with which diabetic coma may develop, and the early symptoms of diabetic coma.

Diabetic coma should be thought of in every case of semistupor or unconsciousness. Alcoholism, drug poisoning, and intracranial vascular accidents far outnumber the cases of coma, but certain important features, some or all of which may be present, clinch the diagnosis of diabetic coma. If one suspects diabetic coma, those features which most speedily verify the diagnosis should be investigated at once and initial therapy be started before continuing the more complete investigations.

The urine must be tested for sugar and acetone. If strongly positive reactions are obtained, a sample of venous blood is taken in an oxalated tube and allowed to stand until a couple of drops of clear plasma can be aspirated. This plasma is tested for acetone, and if the reaction is strongly positive (4 plus), the diagnosis of diabetic coma is sufficiently certain so that one should give at once 40 units of regular insulin intravenously and 60 units subcutaneously. Also, 8 ounces of broth to which has been added 1/2 teaspoonful of ordinary table salt should be given by mouth. These simple measures will often correct nausea and stop vomiting in the early stages.

The patient is usually seriously ill, dehydrated, and has varying degrees of air hunger as evidenced by the increased respiratory excursion, a dry skin, and decreased intraocular tension. The eyes are sunken, the tongue is dry; there is dried secretion on the teeth and sometimes strings of tenacious mucus in the mouth. The blood pressure is below normal, the pulse is increased in rate, and of reduced volume; and, in the presence of a serious infection, the body temperature may be elevated. Subnormal temperatures are common, however, and are the rule if no infection is present. The extremities are usually cool. With essential treatment begun in the home, the patient is then moved to a hospital where more detailed studies and closer control of therapy is possible.

The differentiation of diabetic coma from the stupor or unconsciousness due to a hypoglycemia should be a simple matter. In the latter instance, the patient is well hydrated, the skin is moist, the blood pressure is normal or elevated, the pupils are usually dilated, and tendon reflexes are increased with a positive Babinski sign a common finding. Moreover, the hypoglycemic individual was well until perhaps a few mintues or an hour before the onset of the stupor or unconsciousness. Diabetic coma develops much more slowly, taking at least several hours.

Therapy is directed at fundamental faults with the aim to restore physiologic values as rapidly as is practicable. Insulin (regular) is given at half-hour intervals and in amounts adequate to correct the ketosis and bring the hyperglycemia under control. The initial dose is 40 units intravenously and 60 units subcutaneously, and thereafter 50 units are given at half-hour intervals. If no improvement has been achieved after 6 hours, the dosage should be increased to 75 units, and if no improvement is noted after 8 hours, a further

increase in dosage should be made.

Two liters of normal saline are given rapidly, and further quantities are given more slowly but are continued as long as the specific gravity of the whole blood exceeds 1.055 and as long as the hematocrit reading exceeds 50 percent. Following these guides, it will be found that some patients need no more than 3 liters of fluid intravenously, whereas occasional patients need huge quantities. Routinely, except in the case of an oliguric or anuric patient, potassium chloride, 1 Gm. every 4 hours for 5 doses beginning after 4 or 6 hours of therapy is administered. (GP, April '51, G. G. Duncan)

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Spatial Disorientation in Flight: When a pilot takes off from the earth and, within limits, becomes free to fly about in space he is confronted with unique problems in spatial orientation. He must be oriented with regard to the plane, the earth, and, sometimes, to other objects as well. The ability to orient himself, simultaneously, to plane, earth and other objects is an acquired accomplishment and is subject to all the laws of learning and forgetting. Ordinarily this task is easy, but it may become difficult or even impossible under certain flight conditions. Loss of spatial orientation, more commonly termed spatial disorientation, may readily cause the pilot to make a wrong decision which in turn may lead to wrong action.

The pilot, free to maneuver his plane in space, is confronted with unique and sometimes difficult problems in spatial orientation. This may be looked upon as a phenomenon of perception representing the individual's interpretation of stimuli originating in sensory receptors. This total sensory experience is useful in orientation to the plane but only visual perception can safely be used for orientation to the earth and to other objects in space. Thus, the pilot must learn to distinguish between spatial orientation based on visual perception alone and that based on a sensory experience which includes orientation to gravity or to the direction of resultant force. This does not imply a conflict between sensory stimuli either at or below the level of perception but rather a choice on the part of the flyer. This is an acquired accomplishment which is subject to all the laws of learning and forgetting. Under certain flight conditions spatial orientation is a complex and difficult task which calls for rapid and continual reorientation. At great speeds there is so little time to form a complete pattern of the structures in space that the flyer must, to a degree at least, anticipate this pattern in advance.

Loss of orientation, or disorientation, may readily result, in the absence of any pathological factor and when all of the sense organs are functioning normally. The two most important causes are inadequate visual perception and the misuse of gravitational cues.

Inadequate visual perception may be related to the physical stimulus itself, the influence of stimuli from other sense organs or the effect of central factors

on visual perception. The perceptual data may be inadequate on the basis of many environmental factors both within and without the plane. Stimuli from the semicircular canals and otolith organs are influential in causing visual illusion. Finally, it is emphasized that a person perceives things in a manner which accords with his past experience. (Mil. Surgeon, April '51, Capt. A. Graybiel, MC, USN)

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Intraperitoneal Drip After Laparotomies: Animal experimentation has shown that intraperitoneal administration of dextrose, isotonic sodium chloride and vitamin solutions, but not amino acids, is well tolerated, that the fluid is promptly absorbed and that the drip does not contribute to a spread of a localized infection within the abdominal cavity. Accordingly, the customary methods of postoperative administration of fluids have been supplemented by the employment of intraperitoneal drip, observing these rules: (1) a slow drip is employed, instead of a rapid infusion, (2) antibiotics are added for prophylactic purposes and (3) plastic tubing, without a needle, is used to exclude the danger of an injury of a vein.

A simple technic has been developed for the clinical use of intraperitoneal drip. Shortly before or during the operation one of the nurses unscrews the threaded cap from a 1 liter flask which meets the U. S. P. requirements for a type IV container for infusion solutions and adds 0.1 Gm. of streptomycin and 100,000 units of sodium salt of crystalline penicillin. Immediately before closure of the peritoneum the surgeon cuts off the rigid needle adapter with which the disposable tubing is usually equipped and inserts a segment of the tubing approximately 20 cm. long into the peritoneal cavity in such a manner that its end lies as far as possible from the incision and from the intra-abdominal organ operated on. For example, after an operation on the upper part of the abdomen the end of the tubing is placed into the pelvic cavity, whereas after a gynecologic operation the tip points toward the transverse colon. Peritoneum and fascia are closed snugly around the tubing to prevent leakage. After suturing of the skin the surgeon removes the protective covering from the dispensing cap of the tubing which protrudes from the wound and attaches the cap to the container held by the nurse.

The rate of the drip is regulated by the pinch clamp so that no more than 60 drops are delivered per minute. It must be remembered that a change of position by the patient frequently influences the rate of the flow and therefore frequent check-ups are desirable. To prevent leakage, the foot of the bed is raised after a surgical procedure on the lower part of the abdomen, and the head of the bed is raised after an operation on the upper region of the abdomen. When the container is empty, the tubing is withdrawn from the peritoneal cavity.

There is no problem of using several liters of solution in succession; all that is necessary is to unscrew the cap from the empty dispensing bottle and

to attach it to a new container. If solutions are to be given at certain intervals, two alternatives are at the disposal of the surgeon. 1. The procedure just outlined can be employed: the empty container remains attached to the tubing until it is replaced, when desired, by a new one. 2. If at the time of the operation it is planned to use more than 1 liter of solution, a short disposable unit (venotube or venoset) is used, with the male and the female Luer adapters removed. The end of the tubing protruding from the incision is equipped with a "MacQuigg adapter" which is covered with a rubber diaphragm. The tubing attached to the fluid container is equipped with an 18 gage needle. The drip is started by piercing the aforementioned rubber diaphragm with this needle; when the fluid container is empty, the needle is withdrawn from the adapter. Whenever the drip is to be started again, the new dispensing bottle is connected with the tubing protruding from the abdomen, by piercing the adapter with the needle under sterile precautions.

The hydrostatic pressure of the fluid is apparently able to overcome the interference which may be created by the omentum or other intra-abdominal organs pushing against the outlet of the tubing within the peritoneum.

Isotonic sodium chloride solution, or 5 percent dextrose solution in distilled water or in saline solution respectively, with or without the addition of vitamins, was administered by intraperitoneal drip to patients at St. Elizabeth Hospital after various abdominal operations: 1 gastroenterostomy; 4 cholecystectomies; 1 cholecystostomy; 1 exploratory laparotomy (retroperitoneal sarcoma); 5 appendectomies (3 acute, 2 chronic); 1 appendectomy, excision of ovarian cyst and supracervical hysterectomy; 1 excision of an ovarian intraligamentary tumor; 2 supracervical hysterectomies; 4 supracervical hysterectomies and salpingo-oophorectomies; 1 supracervical hysterectomy and anterior colporrhaphy and 2 panhysterectomies.

The number of patients in whom intraperitoneal drip was employed is not sufficient to be empirically conclusive, but the dearth of complications suggest that the method permits administration of fluids with impunity, providing strict asepsis is observed. Great stress is laid on the rate of flow. If the fluid is administered more rapidly than at the rate of 200 cc. per hour or 60 drops per minute, a transient distention of the abdomen may result. Ascites, acute or chronic peritonitis and carcinomatosis of the abdominal cavity may be considered contraindications to the use of the method.

For the treatment of shock the intraperitoneal drip would be inadequate because the absorption is too slow. Other methods, such as intra-arterial infusion, or venoclysis under pressure, effect a more rapid restoration of such vital factors as blood volume, blood pressure and oxygen-carrying power. This effect could be sustained, if necessary, over a longer period by the slower acting intraperitoneal drip.

It is hoped that the superiority of the drip method over rapid infusion, in regard to better tolerance, absence of abdominal distention and avoidance of reaction, will apply not only to dextrose or saline solutions but also to blood. (A. M. A. Arch. Surg., April '51, J. K. Narat & A. K. Carton)

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Spontaneous Rupture of the Esophagus: By the term "spontaneous rupture of the esophagus" is meant the rupture of an esophagus presumed to have been previously normal. Spontaneous rupture of the esophagus is considered a rare event and recovery from such a catastrophe is even more rare. The first description of the lesion was made in 1723, and the first diagnosis during life was made in 1914. It was not until 1947 that the first case of recovery was recorded in the literature. Barrett reported a case in which the tear was closed with a purse-string suture and the patient recovered. At about the same time Olsen and Clagett reported a case in which a patient recovered following closure of the tear. The case here presented is of interest because it is one of the first cases reported in which closed thoracotomy and drainage, in conjunction with the newer antibiotics, were instituted early in the course of the disease and the patient recovered.

In most cases of spontaneous rupture of the esophagus recorded in the literature no previous history is obtained to lead one to suspect disease of the esophagus. There is a striking similarity, however, in the history, physical findings, and clinical course of these patients. Most of the patients are men between the ages of 35 and 45 who experience severe abdominal and chest pain during episodes of vomiting following an alcoholic debauch. The pain is constant and radiates across the upper abdomen and lower chest and into the back. Some degree of shock is usually present. Respirations are short, rapid, and shallow, and there is a splinting of both the chest and abdomen with resulting dyspnea and even cyanosis in some instances. Swallowing either liquids or solid food causes severe pain in the chest. Tenderness and rigidity are usually present across the upper abdomen and the chest is clear for a short period of time after the rupture. These signs usually continue for the first few hours and then there is a rupture into the pleural cavity which usually occurs on the left side. Only 2 cases were found in the literature in which the patient was operated upon before rupture occurred into the pleural cavity. The physical signs at this time are usually those of pleural effusion on the left side. After the first few hours subcutaneous air may be palpable in the neck or noted on roentgen examination. This finding has been present in over 80 percent of the cases reported but it may be transient and can be easily overlooked. Also at this time there is some rigidity of the abdomen, described as "boardlike" in many instances. An exploratory laparotomy with a preoperative diagnosis of perforated peptic ulcer has been performed in about 15 cases due to this finding.

When a patient gives a history of sudden pain in the chest, especially the lower chest or upper abdomen, which has occurred during vomiting, spontaneous

rupture of the esophagus should be considered. Although there are no early symptoms or physical findings characteristic of spontaneous rupture of the esophagus, the presence of air in the neck of a patient with this history is diagnostic. With the exception of trauma no other condition except possibly primary spontaneous pneumothorax will produce mediastinal emphysema and it is rare in this condition.

Usually the diagnosis may be confirmed by giving a radiopaque oil by mouth and demonstration of its presence in the mediastinum by roentgenogram. Barium should not be given if a perforation of the esophagus is suspected. The fluid obtained from the pleural cavity usually produces an acid reaction, the present case being the only one reported in which an alkaline reaction was obtained.

The condition of those patients who are not treated surgically deteriorates progressively and the majority will die within 2 days after the rupture occurs. There have been 2 cases reported in the literature in which a localized empyema and mediastinal abscess developed, the perforation closed spontaneously, and recovery followed drainage of the empyema or mediastinal abscess. Most surgeons agree that the most important single factor in the treatment of spontaneous rupture of the exophagus is the time interval between rupture and surgery, but not all agree as to the most effective type of operative procedure in these cases. Generally, 2 types of operative treatment are advocated: thoracotomy with drainage, and thoracotomy with repair of the laceration.

Ideally, the correction of this condition should follow the same lines as the treatment of a perforated peptic ulcer, that is, closure of the defect; however, the decision to undertake such an operation may not always be good judgment. The patient is acutely ill, in shock with a reduced vital capacity, and is a poor candidate for anesthesia or surgery, even though some improvement may occur when the pleural cavity is opened and compression of the mediastinal structures is released. It has been emphasized that the time interval is an important factor. When the patient is seen only a few hours after the perforation and the diagnosis is made early, the tear should be closed. This is best performed through a transthoracic approach under an endotracheal anesthetic. In only 1 case in the literature was the repair attempted through the abdomen and this was unsuccessful. In the patient in whom the diagnosis is made later and the patient is critically ill, a rib resection and drainage of the pleural cavity with the concomitant use of the newer antibiotics offers a better change of recovery than was formerly the case. Gastric suction with a Levine tube in the stomach should be continued for several days. It is important to make a scout film of the abdomen after the Levine tube is inserted, one case having been reported in which the tube was placed in the mediastinum. When the suction has been discontinued the patient may be fed through the Levine tube and a

gastrostomy or jejunostomy is not necessary. The other side of the chest should be watched carefully and thoracentesis should be performed if fluid develops, and the pleural cavity drained if necessary. (Surgery, April '51, D. Dunavant & E. F. Skinner)

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Benign Spontaneous Hemopneumothorax: Examination of the medical literature yields the impression that spontaneous hemopneumothorax is very rare and usually fatal. It is believed that neither of these statements is true.

The medical literature contains reports of approximately 60 cases of spontaneous hemopneumothorax with the autopsy findings in 14 patients who died. There is a natural tendency to report cases with autopsy findings rather than patients who have recovered and remained well. The present report concerns 12 patients with benign idiopathic spontaneous hemopneumothorax, each of whom had a relatively uncomplicated course with full recovery and no complications. It is believed that spontaneous hemopneumothorax is but a variation of the more commonly described benign spontaneous pneumothorax. The former has the added complication of a tear of a pleural adhesion or an emphysematous bleb with gross bleeding into the pleural cavity.

Benign idiopathic spontaneous hemopneumothorax is neither a common nor a rare condition and presumably there have been many more cases than the 60 reported in the literature. In the writers' series of 112 consecutive cases of benign idiopathic spontaneous pneumothorax, there were 5 patients who had grossly bloody pleural fluid (spontaneous hemopneumothorax), an incidence of 4 percent. Of those cases reported in the literature, all patients but 2 have been men and the 12 patients of the present study were all men. The age incidence reported in the literature has been quite constant, with most of the cases occurring between 20 and 40 years of age. The 12 patients of the present report ranged in age from 20 to 44 years.

The pathogenesis of spontaneous pneumothorax or spontaneous hemopneumothorax has not yet been established. Exertion or trauma are usually not causal factors. Various theories have been presented, including rupture of a valvelike vesicle situated on or near the pleural surface; congential pleural defect with the formation of pleural blebs; rupture of a thin mediastinal pleura, permitting air to escape into the pleural cavity and rupture of a pleural bulla secondary to localized interstitial subpleural emphysema. In several of the autopsies in fatal cases of spontaneous hemopneumothorax, torn adhesions and ruptured bullae as well as adhesions may be richly vascularized. Nevertheless, the source of bleeding cannot always be ascertained at autopsy.

Hemopneumothorax may occur in tuberculosis, but in such instances the tuberculous disease is usually both obvious and advanced. Consequently, cases

in which tuberculosis is not obvious or easily discovered at the time of the spontaneous hemopneumothorax may be considered to be probably nontuberculous. Hemopneumothorax is uncommon even in advanced pulmonary tuberculosis. Neoplastic disease with involvement of the pleura occasionally gives rise to hemopneumothorax.

The clinical picture of hemopneumothorax is very similar to that of benign idiopathic spontaneous pneumothorax. There are, however, 2 additional complications: the greater likelihood of shock, and the rapid development of anemia due to extensive bleeding into the pleural cavity. The usual history is that of a young adult male, between 20 and 40 years of age, who is between 15 and 45 pounds underweight, and who, while at rest or at mild activity, suffers a sharp, sudden, unilateral severe pain of the anterior chest. The physical examination reveals the previously healthy patient to be dyspneic, probably cyanotic, splinting one side of his chest, and in a state of semi-shock or actual shock. The affected side of the chest is flat to percussion with absent breath sounds, and thoracentesis yields grossly bloody fluid. It is believed by some that cardiac and respiratory movements defibrinate the blood in the pleural cavity, producing fibrin deposits on the pleura and leaving most of the blood unclotted. Blood in the pleural cavity may contain no fibrinogen, prothrombin, or thrombin.

The chest roentgenogram reveals a hydropneumothorax. The fluid level is usually between the 4th and 11th ribs posteriorly. The leukocyte count is usually within normal limits, although the erythrocyte sedimentation rate may be slightly elevated or normal.

Therapy is directed toward the general condition of the patient (management of shock, transfusions, and similar procedures) and his thoracic ailment (thoracentesis of bloody fluid and, perhaps, withdrawals of intrapleural air if there is any dyspnea). Decortication may be necessary later to remove the dense, gelatinous, hemorrhagic layer adjacent to the pleura. The optimum time for this procedure, if indicated, is usually 4 to 8 weeks after the intrapleural bleeding. Only 1 of the patients in the present study required decortication. It should be mentioned that encouraging results have been observed from the early use of preparations of the enzyme streptokinase-streptodornase in cases of hemothorax. (Am. Rev. Tuberc., April '51, L. Hyde & B. Hyde)

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Early Diagnosis and Management of Gout: Gout is essentially a disease of the geriatric age group, rarely seen before the age of 30, but the commonest type of acute arthritis after the age of 40. The gout patient is old enough to have, or to have had, any other type of arthritis. According to the present knowledge, no particular type of arthritis confers immunity against any other type. There-

fore, the patient must be evaluated individually, with the doctor frequently making the diagnosis of "mixed arthritis". This perhaps accounts in part for the 17 percent of gouty patients in this series as compared with the 10 percent commonly given in other reports. The fact that these patients were in the better socio-economic groups and that over 80 percent of them were past 40 years of age also accounts for the higher incidence. In respect to the socio-economic factors, it is recalled that only 10 cases of gout were so diagnosed at Bellevue Hospital over a period of 10 years.

In treating a case of acute arthritis of undetermined etiology in an adult, the pertinent history is first obtained, then a sample of blood is withdrawn for serum uric acid determination and 1.0 mg. of colchicine is injected intravenously through the same venipuncture. The colchicine is repeated in 3 to 6 hours for 3 to 12 doses, depending upon the patient's response. Of course, if the original serum uric acid sample of blood was not taken on a fasting level, it is taken opportunely during this course of the intravenous colchicine therapy. If the serum uric acid is found to be elevated over 4 mg. percent, 1 to 2 Gm. of sodium salicylate are administered with subsequent doses of colchicine. Perhaps the most important question in the history of the patient is that of ascertaining what medications, if any, he has taken prior to the consultation. For obvious reasons, it may be misleading merely to ask him if he has taken aspirin or salicylate, as he may well have been taking some medication containing salicylate without being aware of it.

Since colchicine is a specific for acute gout, it is felt that a diagnosis of clinical gout is justified when a case of acute arthritis responds favorably in from 12 to 72 hours on intravenous colchicine. If the serum uric acid exceeds 4 mg. percent, the diagnosis is doubly justified, because a hyperuricemia alone is considered to be as valuable a test in gout as is the basal metabolic rate in a case of thyrotoxicosis. This approach is safe, and is much more scientific and controllable than the oral therapeutic or diagnostic test. It not only assumes primary interest in the patient but closely equivalent interest in the underlying pathology.

The patient is put to bed and given a soft diet and abundant fluids, with due consideration to the individual complications or co-existing disease. Opiates of any kind are avoided during the diagnostic phase. Once the diagnosis is established, opiates for the relief of pain are optional, but are not given to control diarrhea or nausea and vomiting for the reason that these more undesirable side-effects do not arise on intravenous colchicine therapy.

A more appropriate type of patient on whom to institute good personal hygiene and preventive medicine could hardly be selected. Most gouty patients are overweight, they overeat and overdrink, they are in need of exercise, good air, and sunshine. Many have incipient hypertension, remedial biliary disease, and

various types of foci of infection. They are in the cancer age group. Their occupational and economic status lend them to the coronary artery and cerebrovascular groups. They are more susceptible to a variety of serious complications such as nephritis, hypertension and arteriosclerosis. Every gouty patient should have the benefit of a thorough diagnostic survey. This can best be done after an acute attack has subsided. Everything reasonable should be done to bring the patient to the highest level of health and keep him there. It is not possible to prescribe a bottle or box of colchicine tablets and tell the gouty patient to use as many as he thinks he needs upon the earliest appearance of acute symptoms, mild or severe, since 8 mg. of colchicine have been fatal. The patient is urged to call the doctor to his home, or, if able, to come to the office. In either case, intravenous colchicine therapy is instituted.

The frequency of this therapy is determined by the individual patient's need. In some of the more advanced or severe cases, or in cases having frequent acute attacks, the colchicine-sodium salcylate is given in amounts previously mentioned, once every other day indefinitely. It is believed that a low-purine, low-fat diet is justified as much as is a controlled diet for the diabetic patient, provided, of course, it is adequate in all known components of a balanced diet and adjusted to the individual patient's weight and other requirements.

The interval treatment is really the treatment of chronic gout. It is well to remember that gout is chronic with acute exacerbations from the onset. The statement that the gouty patient gets over an acute attack completely with no loss of function or damage to the joints is unsound; often a gouty patient eventually has marked deformities and impaired joints. Yater, as well as many others, believe that the interval treatment is more important than that of the acute attack.

If the lower extremities are involved, as they usually are, attention must be given to optimum exercise and walking, minimizing walking up and down stairs and on rough terrain. Physical therapy and massage are useful. Orthopedic surgery is indicated when the patient has disfiguring or disabling tophi.

The intravenous colchicine therapy in gouty arthritis is emphasized. The advantages of intravenous colchicine therapy in gouty arthritis are (1) it possesses therapeutic effects which are the same generally good ones that have made colchicinethe drug of choice in the treatment of gout for the past 1500 years; (2) it offers more exact, controlled dosage; (3) it gives quicker relief for the patient with less discomfort; (4) it provides rest for the patient as well as for the painful part; (5) it does not cause nausea, vomiting or diarrhea in effective dosage; (6) it obviates the necessity of giving the patient opiates unless for pain only and (7) it permits better physician control of a patient suffering considerable pain, and for which a highly potent protoplasmic poison is being used as the drug of choice. The only disadvantages, if they are disadvantages, are those

inherent in the method of intravenous administration, and which are well known to all physicians. (Geriatrics, March-April, '51, F. D. Suttenfield)

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Treatment of Lead Poisoning with Sodium Citrate: The proper management of lead poisoning continues to be debated. The long-standing question of whether or not the patient should be "de-leaded" is not satisfactorily settled. It is generally conceded that the "de-leading" should not be done in any case until after the manifestations of acute plumbism have passed. The effects of the various forms of therapy remain under discussion, except for the certain benefit of calcium in relieving symptoms of acute lead poisoning. Whether various drugs cause lead storage or increased excretion of the lead is still being debated.

Aub, Fairhall, Minot and Reznikoff, in 1926, reported a slight increase in lead excretion when sodium citrate was administered. The increase was not nearly as great as that produced by the use of ammonium chloride and similar medications, which resulted in a reduction of serum pH. They attributed the increased lead excretion produced by sodium bicarbonate and by sodium citrate to the alkalinizing effect of these salts and to the fact that the solubility of trilead phosphate is increased in both alkaline and acid mediums.

Kety and Letonoff have recommended that 4.0 to 5.0 Gm. of sodium citrate be administered 4 times daily; in severe cases, they advise that 50 cc. of a 2.5 percent solution of sodium citrate be injected intravenously. Their rationale for this treatment was based on the concept that lead formed a more soluble, diffusible complex with the citrate ion. Thus, more lead was made available for renal excretion and in a less toxic form. They also postulated that the citrate might be metabolized by the liver, leaving the lead residue to be excreted in the bile and thus in the feces. They demonstrated a rather sharp decline in the blood lead levels with this treatment in a series of 15 cases. In another publication, Kety and Letonoff showed that in a series of patients treated with sodium citrate there was a rise in lead excretion when the total of the urinary and the fecal lead was considered. The most marked rise was in the fecal lead. The longest period during which the lead excretion was followed in these cases was 11 days.

Smith, in his discussion of the treatment of lead poisoning, listed sodium citrate as a storage agent, but said that it had only a transitory effect in the 1 case reported.

The authors report their experience in treating 4 patients for lead poisoning with sodium citrate as the main component of therapy. In treating these 4 cases of lead poisoning, 3 acute and 1 chronic, with sodium citrate, the opinion formed that while adequate oral doses sodium citrate will control

the symptoms of lead poisoning, studies of the lead excreted in the urine in these 4 cases (studies of lead excreted in the feces are lacking) do not warrant the conclusion that sodium citrate increases lead excretion. (Indust. Hyg. & Occup. Med, March '51, H. L. Hardy et al)

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The Importance of a High-Pitched Squeaking Systolic Murmur in the Diagnosis of Aortic Stenosis and Calcification of the Aortic Valve: This report emphasizes the relation of a high-pitched "squeaking" or "musical" systolic murmur to aortic stenosis and calcification of the aortic valve. This is not so widely appreciated as it should be, for the authors have found that a high-pitched musical systolic murmur is more often attributed to obscure causes than to aortic valvular disease; some writers even suggesting that musical murmurs are not significant.

The squeaky systolic murmur of aortic stenosis usually is loudest in the apical region, left sternal border or lower precordium and thus diverts attention from the aortic valve. Always associated with this musical sound, however, is a rough, although perhaps very faint, systolic murmur, with or without a high-pitched quality, heard in the right second interspace. The basal rough or rasping murmur of "classical" aortic stenosis is so often very loud that it should be emphasized that the rough quality may be present even when the murmur is quite faint and at times barely audible. If the diagnosis of aortic stenosis is to be made early, the quality is more helpful than the intensity in the determination of the significance of a basal systolic murmur. Early in the disease, or in an emphysematous or thickwalled chest, it may be so faint that only careful search will reveal its presence. Thus, a precordial or apical systolic murmur with a high-pitched component calls for painstaking search for a basal murmur with a rough quality; when this is found the diagnosis of aortic stenosis may be made.

In addition to this peculiar quality of the murmur of aortic stenosis, it should be noted that the point of maximum intensity often is not in the aortic area, but may occur at or near the apex. When a predominantly apical systolic murmur, even without a highpitched quality, is present in older persons, careful ausculation of the aortic area will often reveal a faint, rough systolic murmur. With such findings a diagnosis of aortic stenosis must be seriously considered.

The earliest finding in aortic stenosis is a relatively faint systolic murmur with a definitely harsh quality, with or without a terminal high-pitched component localized in the second right interspace. This murmur is easily missed and when heard is frequently attributed to a sclerotic or dilated aorta or dismissed as inconsequential. Aortic stenosis is usually a slowly progressive disease that even after 15 or 20 years may show a minimal number of the

"classic" signs and relatively little cardiac functional impairment. The disease process is slowly progressive and a long period may be required for the transition from a faint to an unmistakably significant murmur.

A normal or even accentuated aortic second sound, a wide pulse pressure, a normal electrocardiogram, a normal heart size and even normal configuration on x-ray examination are not infrequent findings in aortic stenosis. Fluoroscopic examination with attention directed toward the aortic valve may demonstrate valvular calcification and thereby confirm the diagnosis. Painstaking search may reveal the presence of a basal thrill even when there are no findings of aortic stenosis other than the murmurs mentioned above. Aortic stenosis has been found to be a surprisingly common cardiac condition in adults over 50 years of age. (New England J. Med., April 5, '51, H. A. Braun and W. J. Comeau)

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Deaths Due to Neoplastic Diseases, 1949: During 1949, there were 966 deaths among Navy and Marine Corps personnel. Injuries accounted for 777 or 80 percent of these deaths. However, when one examines the sick days contributed by the last stay on the sick list preceding deaths, one finds that diseases accounted for more than 90 percent, with neoplastic diseases particularly important.

Approximately 60 percent of the sick days accumulated by those patients who died during 1949 were accounted for by those with a neoplastic condition, averaging almost 120 sick days per person between the time last taken up on the sick list and death. Compared to the average of 28 days for deaths from all diseases, the 58 patients who died of neoplastic disease required on the average 4 times as much care and treatment, indicating that most are long-term cases. About 30 percent of these patients at time of death were in the age group 20-24 years, and 15 percent in the group 25-29 years. Personnel under 30 years of age accounted for 55 percent of the neoplastic deaths during the year. Due to the preponderance of men in the younger age groups, distribution may be considered normal. (Statistics of Navy Medicine, April '51)

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Course in Medical Aspects of Special Weapons and Radioactive Isotopes: The course in Medical Aspects of Special Weapons and Radioactive Isotopes scheduled to be held during the period of 21-26 May 1951 at the Naval Medical School, Bethesda, Maryland, as announced in the Medical News Letter, Vol. 17, No. 5, of 9 March 1951, has been cancelled and rescheduled for the period of 18-23 June 1951. (Reserve Div., BuMed)

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Research Report Issued by Naval Medical Research Activity:

Naval Medical Research Institute, National Naval Medical Center, Bethesda, Maryland.

Variations in Body Temperature and in Performance Under Different Watch Schedules: The diurnal body temperature curves of 9 Navy recruits were modified, in a few days, to conform to a variety of experimental watch routines. The adjustment was better, the less the deviation from the usual watch schedule. There was no adjustment to the dogged watch routine which is followed on large surface warships.

Color naming, and to a lesser extent reaction time and Link Trainer performance, showed a diurnal variation, particularly on the dogged watch routine, the only one which permitted testing around the clock. Though the results were not always clear-cut, in a general way, the higher the body temperature, the better was the performance. In operating the Link Trainer for 20 minutes, the higher the total performance scores, the more uniform were the 10 subscores for successive two minutes of testing.

During the entire experiment, there was a remarkable maintenance of rank by each subject in the scores of the 3 tests, but high ranking in one test was sometimes associated with poor placing in another. No subject excelled in all 3 tests.

The group could be divided into 2 sections, with respect to their body temperature levels: one section had higher and less variable daily mean body temperatures than did the other. The section with the higher body temperature level also had higher performance scores on the Link Trainer, suggesting a new type of temperature index of efficiency. Consumption of coffee was very uneven, varying with hours of the day, watch routines, and individual subjects. Relatively more coffee was consumed during watches in which the body temperature was low and falling. The high body temperature level section drank over three times as much coffee as did the other section.

During sleep, the body temperature did not fall as low in the summer as it did in the spring, in spite of the fact that the temperature and humidity of the air in the sleeping compartment were identical at all times. The duration of sleep, under various watch schedules, did not deviate by more than half an hour, one way or the other, from the control value of 8 hours; except that in one period, when the leisure hours were mainly in the forenoon, the mean duration of sleep was over 10 hours. (Project NM 004 005.01.02)

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From the Note Book

1. The Surgeon General of the Navy, Rear Admiral Lamont Pugh, MC, USN, for outstanding achievements in the field of medicine, was recently elected to membership in the national honor medical society, Alpha Omega Alpha. (BuMed PIO, April '51)

2. It is reported that Sister Celine Heitzman, M. D., of the Order of Missionary Sisters of the Immaculate Conception, of Austin, Texas, is believed to be the only nun who is a practicing physician in the United States. She is the resident physician and superior of the Holy Cross Hospital, Austin, Texas. (The Merck Report, April '51)

3. A new type of calorimeter that continuously measures and records the total amount as well as the individual fractions of heat lost by the human body has been demonstrated by NMRI, NNMC. (BuMed PIO, April '51)

4. "The Lethal Effect of Triethylene Glycol Vapor on Dried Air-Borne Bacteria" is discussed by O. H. Robertson and W. Lester, Jr. (Am. J. Hyg., Jan '51)

5. "Morphologic Lesions due to Acute and Subacute Poisoning with Anti-freeze (Ethylene Glycol)" is discussed in A. M. A. Archives of Pathology, April 1951, by D. E. Smith.

6. The Federal Civil Defense Administration hopes to provide between 40 and 60 reinforced concrete depots in various parts of the country for storage of drugs, medical supplies, and other equipment in event of a major enemy attack. (J. A. M. A. Washington News, 14 April '51)

7. Triethylene Melamine, a compound with nitrogen-mustard-like activity, suitable for oral and intravenous use in the treatment of neoplastic diseases, is discussed in A. M. A. Archives of Internal Medicine, April 1951, by D. A. Karnofsky et al.

8. Coronary thrombosis, contrary to popular impression, is not usually fatal immediately or within a short time. Results of a study by Metropolitan Life Insurance Company statisticians shows that 70 percent of a group of persons who had had one or more coronary attacks were still alive at the end of 5 years, 50 percent at the end of 10 years, and 43 percent at the end of 12 years. ("Outside the Ivory Tower", Am. J. Surg., March '51)

9. The directive requiring possession of the evening dress uniform, by 1 October 1951, by officers of the rank of Commander and above (except Reserves and temporary officers) has been cancelled. The evening dress uniform is retained as an optional uniform and mandatory possession date will be established

later. (Cir Ltr 43-51, BuPers)

10. The nutritional and metabolic requirements in relation to radiation injuries and thermal burns is reported by the Subcommittee on Radiation and Thermal Burns of the National Research Council.

11. "Common Respiratory Diseases in Recruits" appears in the American Journal of Hygiene, March 1951, P. E. Sartwell).

12. The effects of stress and the results of medication in different personalities with Parkinson's Disease is discussed in Psychosomatic Medicine, March-April, 1951, by J. S. Prichard et al.

13. Sir John Parkinson, a distinguished cardiologist of London, spent several hours on 15 April 1951 visiting the Cardiology Department and wards of the Naval Hospital, National Naval Medical Center, Bethesda, Maryland. (BuMed PIO, April '51)

14. The Effects of Potassium Salts in Patients with Heart Disease" is discussed in Journal of Laboratory and Clinical Medicine, April 1951, H. Brown et al.

15. A report on industrial hygiene in the Western zone of Germany can be found in the A. M. A. Archives of Industrial Hygiene and Occupational Medicine, March 1951. (I. R. Tabershaw)

16. The treatment of tuberculosis of the sternum by local excision is discussed in Surgery, April 1951, by D. R. Oliver and J. A. Key.

17. A symposium on "Sublingual or Buccal Administration of Steroid Hormones" appears in CIBA Clinical Symposia, March 1951, H. Lisser et al.

18. "Prescription Writing for Skin Ailments" appears in GP, April 1951. (H. Goodman)

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List of Recent Reports Issued by Naval Medical Research Activity:

Naval Medical Research Institute, NNMC, Bethesda, Maryland.

Field Trial of Shigella Flexneri III Vaccine. VI. Serum Mouse Protective Studies, Project NM 005 048.04.11, 10 November 1950.

Concerning the Dependence of the Surface Energy and Surface Tension of Spherical Drops and Bubbles on Radius, Project NM 000 018.06-05, 14 March 1951.

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BUMED CIRCULAR LETTER 51-55 5 April 1951

From: Chief, Bureau of Medicine and Surgery
To: Commandant, Marine Corps; Chief, Naval Air Training; Commandants, All Naval Districts and River Commands

Subj: Cooperation between the Public Health Service and the Departments of the Army, Air Force and Navy on Milk Sanitation Activities

Ref: (a) Article 0970 Navy Regulations, 1948
(b) BuMed Circular Letter 50-82
(c) Federal Specification C-M-381e, 22 August 1950

Encl: (1) Ltr from Chief, Division of Sanitation, PHS to all Regional Directors, File SAN-MF of February 16, 1951 (without attachments)
(2) List of Public Health Service Milk and Food Consultants
(3) List of Army Area Officers and names of Individuals for Contact

1. Arrangements have been concluded between the components of the Department of Defense and the Public Health Service to coordinate milk-sanitation activities in the interest of promoting efficiency and eliminating duplication of effort. References (a) and (b) direct liaison and cooperation with local health authorities.

2. Enclosure (1) sets forth the details of the arrangements and the extent of help that may be provided. Enclosure (2) lists Public Health Service Milk and Food Consultants; and enclosure (3) lists Veterinary Corps personnel of the Department of the Army.

3. Names and addresses of Public Health Service Regional Milk and Food Consultants, Veterinary Corps personnel of the Department of the Army, Preventive Medicine personnel within Naval Districts including Epidemic Disease Control Units have been exchanged to facilitate liaison in carrying out this agreement.

4. Medical Department personnel are directed to maintain liaison and to cooperate with the Public Health and Veterinary personnel in their vicinity, as listed in Enclosures (2) and (3), in maintaining milk sanitation standards at the highest possible level. Specific instructions will be published as needed to implement this directive.

5. Medical Department personnel assigned duty in connection with milk sanitation shall consult with local and area purchasing officers of the Supply Corps or Quartermaster Corps U. S. Marine Corps to determine extent of compliance with reference (c) in negotiating milk contracts. Sanitation problems in the procurement of milk and milk products should be determined and evaluated if efficient utilization of Public Health facilities is to be realized.

6. Commandants of Naval Districts and River Commands shall assign a qualified officer specific duty in connection with milk sanitation control within each Naval District. Appropriate commands within geographical limits of Naval Districts shall assign responsibility for milk sanitation programs for each practical working area for appropriate groups of Naval and Marine Corps activities corresponding to milk sheds where practical. The overall program shall be coordinated under the officer assigned by the District Commandant to coordinate milk sanitation and shall include duties as necessary to comply with paragraphs 4 and 5. District Commandants shall be advised of such assignments and in turn are requested to keep this Bureau and the appropriate U. S. Public Health Service Regional Medical Director advised of such assignments as well as pertinent problems relating to the milk control program.

H. L. Pugh

The above letter will not be printed in the Navy Department Bulletin.

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BUMED CIRCULAR LETTER 51-56 6 April 1951

From: Chief, Bureau of Medicine and Surgery
To: All Ships and Stations

Subj: Sedated patients; proper identification of

Ref: (a) Army-Navy-Air Force Joint Ltr of 28 Mar 1950; NDB Jan-June 1950, 50-363, p. 330

1. In connection with paragraph 6b of reference (a), all personnel concerned with patient care shall be informed of the following:

a. In addition to normal record requirements, each patient prepared for evacuation who is or who may be sedated for transport or medical reasons shall have securely tied to his person an appropriate tag containing the following information: patient's full name and service number; originating station; destination hospital; and a complete chronological entry reflecting the type, quantity, date, and time of all sedation administered.

b. Hospitals receiving heavily sedated patients without proper identification shall report each instance to the Bureau of Medicine and Surgery.

H. L. Pugh

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BUMED CIRCULAR LETTER 51-57 6 April 1951

From: Chief, Bureau of Medicine and Surgery
To: All Medical Department Activities Giving In-patient Care

Subj: Disposition of Navy clinical records on Army and Air Force dependents and on foreign military personnel attached to Army and Air Force installations

Ref: (a) BuMed Cir Ltr No. 50-122 of 3 Nov 1950

1. Reference (a) provided for the disposition of Navy clinical records and x-rays on Army and Air Force personnel hospitalized in naval hospitals, but did not specifically provide for the disposition of certain other less significant clinical records which arise from joint hospitalization.

2. In the event there is an Army or Air Force Liaison Unit attached to the naval hospital or other activity giving in-patient care, the clinical records and x-rays on dependents of Army or Air Force personnel, as well as those on foreign personnel attached to nearby Army or Air Force installations, shall be turned over to the appropriate liaison unit for disposition in accordance with current regulations of the Service concerned.

3. If there is no liaison unit attached, the Navy clinical records and x-rays on Army and Air Force dependents shall be forwarded to the Civilian Personnel Records Branch, Records Administration Center, AGO, 4300 Goodfellow Boulevard, St. Louis 20, Mo. The clinical records and x-rays on foreign military personnel attached to nearby Army and Air Force installations shall be forwarded to the Office of the Surgeon General, Department of the Army, or the Surgeon General, Department of the Air Force, as appropriate, for transfer to the appropriate foreign military service. These transfers shall be made 6 months after the discharge of the patient.

H. L. Pugh

The above letter will not be printed in the Navy Department Bulletin.

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BUMED CIRCULAR LETTER 51-58 6 April 1951

From: Chief, Bureau of Medicine and Surgery
To: All activities under management control of the Bureau of Medicine and Surgery

Subj: Procedure for preparation and submission of work projects under the Annual Work Request program for Fiscal Year 1952

Encl: (1) Schedule "A" - Annual Work Request program, F. Y. 1952

1. Enclosure (1) covers all instructions necessary for the preparation and submission of Annual Work Request requirements for Fiscal Year 1952.

H. L. Pugh

The above letter will not be printed in the Navy Department Bulletin.

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BUMED CIRCULAR LETTER 51-59 9 April 1951

From: Chief, Bureau of Medicine and Surgery
To: All Ships and Stations having Medical Department personnel aboard

Subj: Syphilis; Treponemal Immobilization Test for

Ref: (a) Art. 16-55, ManMedDept.

Encl: (1) Sample request for TPI test

1. As a result of research there has been developed a new test to determine the presence of an antibody which is highly specific for a diagnosis of syphilis. This test is known as the Treponemal Immobilization Test. Other names include the TPI test and the Nelson Test. This test will determine the presence of an antibody which is separate and distinct from the Wassermann antibody, which is responsible for a positive standard serologic test for syphilis (STS). There is good evidence that the TPI test will detect, with a high degree of accuracy, the specific antibodies produced in treponemal infections, particularly syphilis or yaws. A repeated negative TPI test indicates that the patient probably does <u>not have</u> syphilis, and that the positive STS most likely represents a "<u>biologic false positive</u>" reaction. This test is believed to have great significance in differentiating the diagnosis of syphilis in a person with a positive standard serologic reaction only, from a biologic false positive reaction (BFP).

2. Individuals discovered to have a positive standard serologic test for syphilis, in the absence of clinical or physical findings suggestive of early syphilis, are potential cases for the TPI test.

a. <u>Criteria for requesting the TPI test on any one case are:</u>

(1) Two positive or doubtful standard serologic tests on blood drawn approximately 5 to 7 days or more apart.

(2) No history of previous diagnosis or treatment for syphilis.

(3) No present signs or symptoms of primary or secondary syphilis.

b. Procedure:

(1) Perform with sterile precautions. Draw 20 cc. blood, allow to clot, separate serum aseptically. Place serum in sterile test tube, Stock No. 4-434-650 and enclose completed form, enclosure (1), in a mailing case. Tube should be sterilized by autoclave prior to use. Do not add any chemical preservatives to the serum.

(2) Mail serum to Naval Medical Research Institute, NNMC, Bethesda 14, Maryland, Label mailing case "For TPI Test."

3. In the past it has been noted that many individuals with positive serologic tests for syphilis, in the absence of signs or symptoms of primary or secondary syphilis, have been stigmatized by the establishment of the diagnosis of syphilis solely on the basis of a positive serologic reaction. This practice should be discontinued and the TPI test requested before a diagnosis of syphilis is established, or a BFP determination is made.

4. If practicable, an individual on whom a TPI test is being conducted should be held at his present station until diagnosis is confirmed or ruled out. In the event of transfer, a copy of enclosure (1), as submitted, should be transmitted to the medical officer at the patient's next duty station. Upon receipt of results of the TPI tests, and after a determination of the patient's diagnosis, all findings should be entered in the individual's health record.

5. The TPI test should be requested in format similar to enclosure (1). The tube, test, with screw cap for mailing purposes, stock no. 4-434-650, and case, mailing, stock no. 4-124-020, should be obtained in sufficient quantities, based upon the expected need for two mailing tubes and cases for each individual requiring the TPI test.

H. L. Pugh

The above letter will not be printed in the Navy Department Bulletin.

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BUMED CIRCULAR LETTER 51-60 12 April 1951

From: Chief, Bureau of Medicine and Surgery
To: Hospitals, Hospital Ships, and Ships and Stations Having Accommodations for In-patients

Subj: Standard Medical Record Forms; preparation and use of

Ref: (a) BuMed C/L 51-8

Encl: (1) Statement from Chairman of Interagency Committee on Medical Records

1. In view of comments regarding the intent and scope of reference (a) it appears that its provisions may be interpreted as requiring the use of all of the various forms referred to therein. This was not intended and therefore these orienting comments are being promulgated.

2. An Interagency Committee on Medical Records has been engaged for the past 4 years in the preparation of standard medical forms for use by all Federal agencies, non-military as well as military. The Navy, through its representatives on the committee, has actively participated in this work. The historical development of this project is set forth in enclosure (1).

3. The development of standard medical forms which can be used by civilian agencies as well as the military not infrequently necessitates some degree of compromise, or enlarging the scope of applicability of some particular form, or the adoption of forms which may have only a limited use by one or more of the agencies. It is not intended therefore that all of the forms adopted by this committee will be used by all Federal agencies. It is intended that the standard medical forms will replace any similar forms which may have been developed locally or within the individual agency. Standard Form 502, the Narrative Summary, for example, was developed for, and is used for the most part by, the Veterans Administration. There are occasions when the form will serve a useful purpose in a Naval medical activity, as in the preparation of a brief summary of a clinical record where such use is considered desirable. Its use by the Naval Medical Department, however, will be infrequent and the provisions of reference (a) are not intended to require its use.

4. The committee functions as a continuing body not only in the development of new standard medical forms but in the review and revision of existing forms. In order that the Navy's representative on the committee may be kept advised as to the experience gained in the use of standard forms, the Bureau invites any constructive suggestions, comments or criticism which members of the Medical Department may care to submit. This invitation extends also to the subject of the proposed revision of the Health Record.

H. L. Pugh

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